Note on the Parallax and Proper Motion of the Central Star in the Annular Nebula in Lyra. By Burt L. Newkirk.

(*Communicated by Professor A. O. Leuschner.*)

In a recent article on the annular nebula in *Lyra* (*Monthly Notices*, vol. xlvi., page 106) Professor Barnard draws the following conclusion concerning my investigation of the parallax of the central star: "As Dr. Newkirk's parallax for the central star depends upon the proper motion which he determined, and which is shown not to exist, the parallax itself must be fallacious."

This conclusion is not justified unless a solution of the equations of condition with the proper motion terms omitted indicates that no measurable parallax exists. I have made such a solution with the following results from the eight pairs of comparison stars :—

Pair	π
	"
1– 2	0·00
3– 4	+0·17
5– 6	+0·07
7– 8	+0·02
9–10	+0·13
11–12	+0·06
13–14	+0·05
15–16	+0·07

Weighted mean parallax = $+0''\cdot067 \pm 0''\cdot02$ mean error.

The result obtained when proper motion terms are included in the equations of condition is

$$\pi = +0''\cdot10 \pm 0''\cdot02 \text{ M.E.}$$

If instead of averaging these eight values equations of condition be set up for the simultaneous determination of the parallax and the effect of chromatic dispersion, the above value of the parallax is reduced by $0''\cdot003$ only.

I am fully aware of the uncertainty which attaches itself to investigations of stellar parallax, and realise the desirability of a thorough test of my results. An investigation of proper motion alone, however, does not seem likely to throw much light on the value of the parallax.

Most of the plates used in my parallax investigation were exposed during the years 1899 and 1900, and the series could not therefore form a good basis for an investigation of proper motion. This is explicitly stated on page 15.

The proper motion obtained from the photographic measures was :

$$\Delta\alpha = -0^s\cdot01 \pm 0^s\cdot0036$$
$$\Delta\delta = -0''\cdot00 \pm 0''\cdot045$$

A comparison of measures of the distance nucleus to star a, made at various times by Burnham, Scheiner, Barnard, and Leavenworth gives the values :

$$\Delta\alpha = +0^s\cdot01 \pm 0^s\cdot0013\ *$$
$$\Delta\delta = +0''\cdot18 \pm 0''\cdot037$$

The weighted mean is, in the case of $\Delta\alpha$, practically independent of my photographic measures.

The evidence of proper motion which was presented as a supplement to the parallax investigation rested, therefore, mainly on observational material not used in the parallax determination.

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Some Considerations regarding the Number of the Stars. By Winifred Gibson, B.Sc., Jessel Student, University College, London.

(*Communicated by Professor* ***Karl Pearson****, F.R.S.*)

(1) The aim of the following investigation is to consider whether any suggestion of a limitation of the number of the stars can be inferred from the very full statistics we already possess with regard to stars of the lower magnitudes.

If the universe be at all comparable with the atomic congregations such as we find the physicist postulating in the kinetic theory of gases, we might not unreasonably assume that some one or more characteristics of the stars may obey a chance law of distribution in their frequency ; and hence, if we knew fairly well the frequency distribution for stars of the lower magnitudes, we might hope to construct somewhat roughly the total frequency distribution, and thus possibly obtain a measure, if only the crudest, of the total number of stars.

Unfortunately, however, there is only one character of the stars of which we have as yet anything like ample enough statistics for an inquiry of this kind, namely, the frequency of stars up to about the tenth magnitude ; and even on this point star catalogues and authors are far from being in complete agreement. Proper motions, parallaxes, colours, spectroscopic measurements, &c. have been ascertained at present for too

* By an unfortunate error this was given the negative sign, thus seeming to agree with the results of the photographic measures.